

CLAIMS:

1. An apparatus for analysing systems, the apparatus comprising an architecture storing means for storing  
5 architecture information about the architecture of the system, evaluation means for evaluating the architecture in terms of non-functional requirements of the system, utilising the architecture information, and visualisation means for providing a visual representation of the system  
10 architecture from the stored architecture information.
2. An apparatus in accordance with claim 1, wherein the visualisation means is arranged to provide a visual representation in the form of a hierarchical three dimensional view.
- 15 3. An apparatus in accordance with claim 2, being arranged to represent the stored architecture information as an architectural model, the architectural model including "Components" and "Connections" between the Components, wherein Components are entities within the  
20 system and Connections are bonds or relations between Components.
4. An apparatus in accordance with claim 3, wherein Components and Connections may have properties.
5. An apparatus in accordance with claim 4, wherein the  
25 Components and Connections include values, for data and/or functional and behavioural parameters.
6. An apparatus in accordance with claim 5, wherein Components and Connections may include Sub-Components and Sub-connections.
- 30 7. An apparatus in accordance with claim 6, the model further comprising Ports, Ports being arranged to connect Components and Connections.
8. An apparatus in accordance with claim 7, wherein each

Connection Port can only be attached to one Component Port.

9. An apparatus in accordance with claim 8, wherein Connections are first order entities, being recognised as  
5 equally important in the model as Components.

10. An apparatus in accordance with claim 9, wherein Components and/or Connections may be designated as a certain Type.

11. An apparatus in accordance with claim 10, wherein  
10 Components may be designated as Devices, Devices having processing Capacity.

12. An apparatus in accordance with claim 11, wherein Devices are shared between Components requiring processing capacity.

13. An apparatus in accordance with claim 12, wherein any  
15 Component at any level of the hierarchy can be attached via a Connection to any other (or the same) Component and any other (or the same) level of the hierarchy.

14. An apparatus in accordance with claim 13, the model  
20 further comprising Implementations including groups of standard Properties collected under a name, standard Implementation and which may be related to multiple Components or Connections.

15. An apparatus in accordance with claim 4, wherein the  
25 three dimensional view includes components represented as objects and connections represented as links between the objects, and wherein an object may include, represented within the object space, further components and connections in the system which are of a lower hierarchy  
30 within the architecture.

16. An apparatus in accordance with claim 4, wherein different components or connections are distinguished from each other by altering a visual property of each different

component or connection.

17. An apparatus in accordance with claim 16, wherein the visual property is the colour of the component or connection.

5 18. An apparatus in accordance with claim 16, wherein the visual property is the relative size of the component or connection.

19. An apparatus in accordance with claim 16, wherein the visual property is the shape of the component or  
10 connection.

20. An apparatus in accordance with claim 15, wherein the visualisation means enables a user to manipulate the three dimensional model in order to access different hierarchy levels.

15 21. An apparatus in accordance with claim 15, wherein the visualisation means enables the user to manipulate the three dimensional view to see it from different perspectives.

22. An apparatus in accordance with claim 15, wherein the  
20 visualisation means is arranged to provide the visual representation in the form of a hierarchical tree view.

23. An apparatus in accordance with claim 15, wherein the visualisation means is arranged to provide a plurality of different visual representations, whereby the architecture  
25 of the complex system can be viewed from a plurality of different perspectives.

24. An apparatus in accordance with claim 1, wherein the evaluation means includes a simulation means arranged to utilise the architecture model to simulate operation of  
30 the system, whereby the system operation may be evaluated.

25. An apparatus in accordance with claim 1, wherein the architecture storing means is arranged to store a plurality of different levels of abstraction of the

architecture, and wherein the apparatus enables a user to view the architecture at any of the plurality of levels.

26. An apparatus in accordance with claim 1, including capability space diagram generating means for generating  
5 capability space representations, providing a model of required system capability with respect to systems requirements properties.

27. An apparatus in accordance with claim 26, wherein the capability space representation includes a frame reference  
10 axis drawn from the properties that comprise the systems functional schema model.

28. An apparatus in accordance with claim 27, wherein the capability space diagram has more than two dimensions.

29. A method of analysing systems, comprising the steps  
15 of obtaining architecture information about the architecture of the system, evaluating the architecture in terms of non-functional requirements of the system, utilising the architecture information, and providing a visual representation of the system based on the obtained  
20 architecture information.

30. A method in accordance with claim 29, wherein the step of providing the visualisation includes the step of providing a hierarchical three dimensional view.

31. A method in accordance with claim 30, further  
25 including the step of storing the architecture information represented as "components", and "connections" between the components.

32. A method in accordance with claim 31, wherein the components include information on data, functional and  
30 behavioural parameters of the components and the connections include information on data, functional and behavioural parameters of the connections.

33. A method in accordance with claim 31, wherein the

components include "ports" connecting to connections.

34. A method in accordance with claim 31, wherein the components include Devices which may be utilised in the system.

5 35. A method in accordance with claim 31, wherein the architecture information also includes information on constraints of the system.

36. A method in accordance with claim 31, wherein the three dimensional view includes components represented as  
10 objects and connections represented as connections between the objects, and wherein an object may include, represented within the object space, further components and connections in the system which are of a lower hierarchy within the architecture.

15 37. A method in accordance with any one of claim 36, whereby different components or connections are distinguished from each other by altering a visual property of each different component or connection.

38. A method in accordance with claim 37, whereby the  
20 visual property is the colour of the component or connection.

39. A method in accordance with claim 37, whereby the visual property is the relative size of the component or connection.

25 40. A method in accordance with claim 37, whereby the visual property is the shape of the component or connection.

41. A method in accordance with claim 40, further including the step of enabling a user to manipulate the  
30 three dimensional model in order to access different hierarchy levels.

42. A method in accordance with claim 41, further including the step of enabling a user to manipulate the

three dimensional view to see it from different perspectives.

43. A method in accordance with claim 42, wherein the step of providing the visualisation includes the step of  
5 providing a three dimensional tree view.

44. A method in accordance with claim 43, wherein the step of providing a visual representation includes the step of providing a plurality of different visual representations so that the system can be viewed from the  
10 plurality of different perspectives.

45. A method in accordance with claim 44, wherein the step of evaluating the architecture includes the step of utilising the architecture information to simulate operation of the system, whereby the system operation may  
15 be evaluated.

46. A method in accordance with claim 45, further including the step of enabling re-modelling of the stored architecture information to provide an amended architecture, whereby the amended architecture may be  
20 evaluated in terms of non-functional requirements.

47. A method in accordance with claim 46, further including the steps of storing a plurality of different levels of abstraction of the architecture, and enabling a user to view the architecture at any of the plurality of  
25 levels.

48. A method in accordance with claim 47, wherein the architecture information is obtained from a representation of a visualisation of an architecture.

49. A method in accordance with claim 48, further  
30 including the steps of generating capability space representations, and providing a model of required system capability with respect to systems requirements properties.

50. A method in accordance with claim 49, wherein the capability space representation includes a frame reference axis drawn from the properties that comprise the systems functional schema model.

5 51. A method in accordance with claim 50, wherein the capability space diagram has more than two dimensions.

52. A method of evaluating a system, comprising the steps of utilising an apparatus in accordance with claim 1 to model the architecture of the system and to evaluate the  
10 system in terms of non-functional requirements of the system, utilising the architectural information that has been modelled.

53. A method in accordance with claim 52, including the further step of proposing changes to the architectural  
15 model and re-evaluating.

54. A method of developing a system, utilising the apparatus of claim 1, comprising the steps of defining a complex system architecture and modelling the architecture utilising the apparatus of claim 1, and evaluating the  
20 system architecture in terms of non-functional requirements it is proposed to meet.

55. A method in accordance with claim 54, comprising the further step of proposing changes to the architectural model and re-evaluating.

25 56. A method in accordance with claim 55, comprising the further step of engineering the system in accordance with the architecture that has been modelled.

57. A computer program arranged, when loaded onto a computing system, to control the computing system to  
30 implement a method in accordance with claim 29.

58. A computer readable medium providing a computer program in accordance with claim 57.